

**What is claimed is:**

1- A probe card contact apparatus including in combination:

5 a support block, having a curved shape on one major surface, a planar second surface, and an opening in the center,

one or more comb assemblages having a plurality of two-metal probe needles adhered to the first surface of a polymeric film segment wherein the fine tips of the needle  
10 extend beyond the film, and the fingers on the opposite end are secured atop the curved surface of said support block, and

a probe card having an opening fitted to said support block perimeter and a plurality of conductive traces  
15 corresponding to said probe finger terminations.

2- An apparatus as in claim 1 wherein said two-metal probe needles comprise a noble metal or a metal having surface oxidation integrally connected with conductive metal fingers of a different composition.

20 3- An apparatus as in claim 1 wherein said two-metal needle probes comprise a single conductive metal having a noble metal deposited on the tips.

4- An apparatus as in claim 1 wherein said needle tips extending beyond the film and said central opening in the

support block are formed downward below the level of said block.

5-An apparatus as in claim 1 wherein said noble metal tips are in the range of 0.00075 to 0.0015 inches thick.

5           6- An apparatus as in claim 1 wherein said noble metal  
tips are a minimum of 0.050 inches long.

7- An apparatus as in claim 1 wherein the width of probe needle tips is in the range of 0.00075 to 0.002 inches.

10           8- An apparatus as in claim 1 wherein said noble metal  
comprises palladium.

9- An apparatus as in claim 1 wherein said noble metal comprises rhodium.

10- An apparatus as in claim 1 wherein said noble metal  
15 comprises gold.

11- An apparatus as in claim 1 wherein said second metal comprises a beryllium and copper alloy.

12- An apparatus as in claim 1 wherein said needle fingers are spaced further apart than the needle tips.

20 13- An apparatus as in claim 1 wherein said polymeric film is a thermally stable dielectric material.

14- An apparatus as in claim 1 wherein said polymeric film is in the range of 0.001 to 0.003 inches thick.

15- An apparatus as in claim 1 wherein said polymeric  
25 film is of the polyimide family.

16- An apparatus as in claim 1 wherein said support block comprises a dielectric material having a coefficient of thermal expansion in the range of 2 to 8 PPM.

17- An apparatus as in claim 1 wherein said support  
5 block comprises a ceramic material.

18- An apparatus as in claim 1 wherein said support block comprises a composite polymer.

19- An apparatus as in claim 1 wherein said the outer perimeter of said support block conforms to an opening in a  
10 probe card.

20- An apparatus as in claim 1 wherein said needle fingers are customized to optimize impedance of specific needles.

21- An apparatus as in claim 1 further including a  
15 ground plane patterned on the second surface of said polymeric film.

22- An apparatus as in claim 1 wherein the needle pattern is software generated and input to a laser.

23- An apparatus as in claim 1 wherein the needles are  
20 at least partially formed by laser ablation.

24- A contact apparatus including:

a support block, having a curved shape on one major surface, and a planar second surface,

one or more comb assemblages having a plurality of two-  
25 metal needles adhered to the surface of a dielectric film

with the needle tips extending beyond the film, and the fingers secured to the curved surface of said support block.

25- A contact apparatus including:

5 a support block, having two parallel major surfaces,  
one or more comb assemblages having a plurality of two-metal needles adhered to the surface of a dielectric film with the needle tips extending beyond the film, and the fingers secured to one of the major surface of said support block.

10 26- A method of fabricating a probe card contact apparatus including the following steps:

- 15 -providing a two-metal sheet comprising on one edge a strip of a noble or limited oxidizing metal integrally connected to a larger section of a different conductive metal,  
-attaching said two-metal sheet to a polymeric film with the noble metal overhanging the polymeric film by at least 0.050 inches,  
-photolithographically defining a needle pattern, chemically etching features greater than about 100 microns, and laser  
20 ablating needle features less than about 100 microns,  
-punching comb shaped segments of polymeric film with attached needles,  
-positioning one or more segments of film with needles on a semi-arc shaped surface of a support block with the noble

metal tips extending into a central opening in the support block,

-forming the needle tips downward to a position below opposite surface of the block, and

- 5 -aligning and positioning the block into an opening in a probe card with terminals of the needle fingers in contact leads on the probe card.

27- A method of fabricating a probe card contact apparatus including the following steps:

- 10 -providing a two-metal sheet comprising on one edge a strip of a noble or limited oxidizing metal integrally connected to a larger section of a different conductive metal,
- attaching said two-metal sheet to a polymeric film with the noble metal overhanging the polymeric film by at least 0.050
- 15 inches,
- depositing a laser ablatable film over the exposed surface of said metal sheet,
- inputting a pattern for the needles to a laser, and ablating the deposited film to form a mask,
- 20 -etching the two-metal sheet to completely remove unwanted metal,
- punching comb shaped segments of polymeric film with attached needles,
- positioning one or more segments of film with needles on a
- 25 semi-arc shaped surface of a support block with the noble

